

claims 5-12 and 18 under 35 USC §112 as set forth in paragraphs 2 and 3 of the Office Action.

Applicant has also cancelled claim 19 and rewritten it in independent form as new claim 28. Previous claims 20 and 21 have been amended to depend on new claim 28. It is believed that claims 20, 21 and 28 ought now be in condition for allowance per paragraph 8 of the Office Action.

Claims 1 and 18 have also been amended to specify that the colloidal suspension formed is a stable suspension. Support is found, inter alia, in original claim 13.

Thus, the claims now in the application are claims 1-3, 5-18 and 20-28. Of these, claims 13 and 22-27 are allowed and claims 20, 21 and 28 should now be allowable.

Claims 1-3, 5-7, 10-12 and 14-18 stand rejected under 35 USC §102(b) as anticipated by Calvert et al.

In making this rejection, the Examiner has basically repeated the position taken in the earlier Office Action of 12/14/94.

Applicant would first point out that nowhere in Calvert is it taught that the process used by patentee involves a first step of completely dissolving the source of silica in the aqueous solution prior to conducting the crystallization step. Part (b) of claim 18 requires that the synthesis mixture is boiled for a period of time sufficient to dissolve the silica source, and the resulting solution is then crystallized according to part (c). The heating step recited in example 1 of Calvert (col. 7, lines 51-57) is actually a crystallization step involving refluxing at 98°C for 30 hours, and is analogous to the autoclave treatments disclosed by patentee in Examples 3-5. Subjecting a synthesis mixture to conditions where crystals form is hardly the same as subjecting a

mixture to conditions where synthesis components are dissolved.

The Examiner has also equated reflux conditions to boiling. This is not so. Heating under reflux means that water loss due to vaporization is condensed back into the reaction vessel containing the synthesis mixture. Calvert's reflux temperature is 98°C which is not boiling temperature. Since Calvert's synthesis mixture also contains dissolved salts, it is clear that it would require a temperature in excess of 100°C to boil the mixture.

In addition, none of the other crystallization conditions of Calvert involve boiling since they are conducted either in an autoclave or in polypropylene jars at 100°C.

On this basis alone the rejection under 35 USC §102 is improper. As stated by the CAFC in In re Bond, 15 USPQ 2nd 1566 (Fed. Cir. 1990)

"For a prior art reference to anticipate in terms of 35 USC §102, every element of a claimed invention must be identically shown in a single reference."

In addition, the Examiner has stated that the formation of a gel in Calvert's example 1 implies that a sol is first formed. This is not so. The gel obtained by Calvert is simply the result of the mixing process used by Calvert. The colloidal silica used by Calvert in example 1 will gelate upon contact with an alkali resulting in a stiff mass which is hard to stir. Thus, the fact that a gel is formed indicates that the silica is not dissolved during the preparation of the synthesis mixture, despite the molar ratio of  $R/SiO_2 = 0.62$  used by Calvert (col. 7, line 50). If the silica were dissolved, a solution would form, not a gel. Since Calvert does not boil prior to the formation of the disclosed gel, as required by the instant process claims, then he does not form a solution prior to obtaining the gel.

Also, with respect to instant claim 12, Calvert discloses an  $\text{OH}^-/\text{SiO}_2$  molar ratio of 0.34, but this ratio excludes the  $\text{OH}^-$  contribution of the organic base (see col. 2, lines 13-16). In the present application, the  $\text{OH}^-/\text{SiO}_2$  molar ratio is calculated from the  $\text{OH}^-$  contribution of the inorganic base and the organic base. In the case of Example 3, (zeolite  $\beta$ ) of the application, the  $\text{OH}^-/\text{SiO}_2$  molar ratio is according to Calvert's definition zero (there is no inorganic base present). Therefore the  $\text{OH}^-/\text{SiO}_2$  molar ratio of the application cannot be compared with that of Calvert.

Also, it is not seen how the Examiner can maintain that product claims 1-3 and 14-17 are anticipated by Calvert if the process claims are not anticipated for the reasons set forth above. In addition, Calvert points out that the zeolite beta crystals obtained in his process are all recovered by simple filtration. This indicates that the particles are not colloidal, since colloidal particles as claimed (100 nm or less) are not retained by a filter. The only practical way to recover colloidal particles is to use a high speed centrifuge, as is done in the Examples of this Application - note page 11, lines 8 and 9.

Claims 8 and 9 stand rejected under 35 USC §103 as unpatentable over Calvert.

Applicant urges that this grounds for rejection is also inappropriate for the reasons given above. There is nothing in Calvert which teaches boiling of the synthesis mixture containing the silica source to form a solution, irregardless of whether the silica source is in solid or flowable form.

Claims 1-3, 5, 6, 10-12 and 14-18 stand rejected under 35 USC §102(b) as anticipated by Argauer et al.

The Examiner states that Argauer et al. teach a method of making Z5M-5 by preparing an aqueous solution of TPAH,  $\text{SiO}_2$  and sodium

aluminate at 100°C and then crystallizing at a temperature of 100-175°C.

Applicant once again would reiterate that Argauer does not disclose boiling the synthesis mixture to essentially completely dissolve the silica source prior to crystallization. In example 1, Argauer heats a mixture containing SiO<sub>2</sub> and TPAH (free of sodium aluminate) up to about 100°C and then adds sodium aluminate dissolved in water. There is no teaching of boiling the initial mixture, which, as stated above, would require temperatures in excess of 100°C at atmospheric pressure. Also, Argauer specifically states that the silica source is only partially dissolved, not essentially completely dissolved, in the synthesis mixture.

It is not seen on what basis the Examiner can view the disclosure of Argauer to anticipate the claims when the reference does not disclose the essential features of the invention, i.e., boiling the synthesis mixture to essentially completely dissolve the silica source vs. only partial dissolution of silica source as in Argauer - In re Bond, supra.

Further, there is no disclosure in Argauer that the mixture which patentee heats also contains one or more of the elements of claim 5 or that the zeolite produced is a MEL or beta zeolite as in claims 15 and 16.

The process and product claims also differ from Argauer in terms of the particle size of the zeolite products produced. Patentee separates the particles from crystallization mixture by simple filtration which indicates that the particles can not be colloidal (100 nm or less), as discussed above. In fact, where patentee does disclose particle sizes, they are considerably larger than colloidal - Example 2, 1 micron; Example 26, < 1 micron; Example 27, 8x20 microns. Thus, Argauer does not teach a process for preparing a molecular sieve of the dimensions specified in the

preamble of claim 18 or the product itself having dimensions as set forth in claim 1.

It is also to be noted that in all Examples of Argauer, crystallization temperatures of 125 to 175°C are used, not temperatures of 120°C or below as set forth in claim 18. As pointed out in the previous amendment, Example 1 of the specification shows that crystallization of ZSM-5 zeolite at temperatures above 120°C gives rise to crystals having dimensions outside of those claimed.

... In summary, Applicant's invention involves the combination of boiling the synthesis solution coupled with a relatively low temperature of crystallization which gives rise to the production of colloidal zeolite materials which in turn may be used to produce stable colloidal suspensions. Such a process is neither disclosed by or obvious in view of the prior art.

It is respectfully urged that all claims (1-3, 5-18 and 20-28) are now in condition for allowance which action is earnestly solicited. In the event the Examiner decides to maintain the rejection, it is requested that this Amendment be entered for the purpose of Appeal.

Respectfully submitted,

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3-20-96  
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